



EFFECTIVENESS OF IVERMECTIN AS A TREATMENT MODALITY FOR CUTANEOUS LARVA MIGRANS: A CASE SERIES

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ABSTRACT

Cutaneous larva migrans (CLM) is a parasitic skin infection caused by the penetration of nematode larvae into the epidermis, typically following direct contact with contaminated soil or sand. The disease presents with characteristic serpiginous erythematous papules accompanied by intense pruritus and is commonly found in tropical regions with warm and humid climates. Although hookworm infection affects an estimated 740 million people globally, and Indonesia has a reported prevalence of 30–50%, ivermectin had not been used as a therapeutic option for CLM in Indonesia prior to the COVID-19 pandemic due to limited availability. The purpose of this report is to describe the clinical response of CLM patients treated with oral ivermectin as an alternative therapy that has only recently become accessible in Indonesia. This study was conducted as a descriptive case series. The respondents were three patients attending the dermatology outpatient clinic who were clinically diagnosed with cutaneous larva migrans. Data were obtained through patient interviews, dermatological examinations, dermoscopic evaluation, eosinophil counts, and clinical documentation before and after treatment. All patients received a single oral dose of 12 mg ivermectin. Three patients—two aged 67 years (one male and one female) and one 40-year-old female—presented with serpiginous erythematous papules accompanied by pruritus for 3 to 4 weeks. Two of them had previously shown no improvement with mebendazole and topical betamethasone. All patients demonstrated complete resolution of lesions after receiving a single 12 mg dose of ivermectin without any adverse effects. The results showed a 100% clinical cure rate across all cases, with no reported side effects following treatment. This case series highlights the effectiveness and safety of single-dose oral ivermectin for CLM and suggests that ivermectin may be considered a viable therapeutic option for the management of CLM in Indonesia.

Keywords: cutaneous larva migrans; ivermectin; nematode larvae; serpiginous lesions

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INTRODUCTION

Cutaneous larva migrans (CLM), also known as creeping eruption, is a skin infection caused by the penetration of nematode larvae through the epidermis.¹ This infection usually occurs through direct skin contact with larvae commonly found in soil or sand contaminated by animal feces (Verzi, A. E., et al., 2020). CLM is widespread worldwide, particularly in tropical regions such as Central America, South America, Africa, and Southeast Asia, including Indonesia (Rodriguez-Morales, A. J., et al., 2021; Cáceres-Ríos, H., et al., 2020). The clinical symptoms of CLM include linear serpiginous erythematous papules on areas directly exposed to the nematode larvae, such as the feet, lower legs, buttocks, and back, accompanied by itching. (Tasbun, F., et al., 2022). Common hookworms causing CLM include *Ancylostoma braziliense*, *Ancylostoma caninum*, *Uncinaria stenocephala*, and *Bunostomum phlebotomum*. (Maxfield, L., et al., 2024; Ramondetta, A., et al., 2021). Although some CLM lesions may heal on their own, the healing process often takes time, and the resulting itching can be uncomfortable for patients. (Cáceres-Ríos, H., et al., 2020). One effective therapeutic option is the oral administration of ivermectin. (Shamad, M., et al., 2024). The Cutaneous Larva Migrans is often found in tropical and subtropical countries with a warm and humid climate. Approximately 740 million people worldwide are infected with hookworm. In Indonesia, the prevalence is around 30-50%. The Cutaneous Larva Migrans is also found in

Indonesia although there is no exact epidemiology data. (Hidayati, M. N., et al., 2020). Before the COVID-19 pandemic, ivermectin was rarely available in Indonesia, so albendazole was the commonly used treatment for CLM. (Rodriguez-Morales, A. J., et al., 2021; Ramondetta, A., et al., 2021). Ivermectin has never been used as therapy for CLM in Indonesia before because of the unavailability of ivermectin in Indonesia. When the COVID-19 outbreak occurred, ivermectin became available with the indication of strongyloidiasis. (Seeger, D., et al., 2023). Ivermectin also works as an anti-inflammation. (Zaidi, A. K., et al., 2022). This case report discusses the use of oral ivermectin therapy in the management of CLM and how ivermectin successfully treat CLM in several cases. The purpose of this study is to describe the clinical outcomes and effectiveness of oral ivermectin in the treatment of CLM cases treated at a dermatology outpatient clinic.

METHOD

This study is presented as a case series involving three patients diagnosed with cutaneous larva migrans (CLM). Data were obtained through direct clinical observation, patient anamnesis, physical and dermatological examinations, and supporting investigations. Additional diagnostic tools included dermoscopic evaluation and laboratory tests, such as complete blood count with eosinophil levels. Clinical photographs were collected to document progression before and after treatment. All patients received a single oral dose of 12 mg ivermectin, and each patient was followed up to evaluate clinical response and potential adverse effects. The data were analyzed descriptively and compared with previously published literature on CLM and antiparasitic therapy outcomes.

RESULT

Case Illustration

Case 1

The first case involves a 67-year-old male who complained of itchy bumps on his right wrist and waist for the past three weeks. The lesions, which appeared as red bumps arranged in a serpentine line, emerged after lying down and walking without clothes and shoes in a sandy area by a lake three weeks earlier. He had a history of taking oral mebendazole 500 mg for three days, but it did not provide any improvement, prompting him to seek treatment at Prof. dr. Chairuddin P. Lubis Hospital, University of Sumatera Utara, Medan. Dermatological examination revealed multiple linear serpiginous erythematous papules on the right forearm and abdominal regions. Blood tests indicated the presence of hypereosinophilia. Dermoscopy examination was not available for this case. The patient was treated with a single oral dose of ivermectin 12 mg and cetirizine 10 mg once daily at night to relieve the itching. The patient was evaluated after 3 days, 1 week, and 3 weeks post-treatment, showing improvement (Figure 1), with no new lesions and the patient no longer experiencing itching in the previously affected areas.

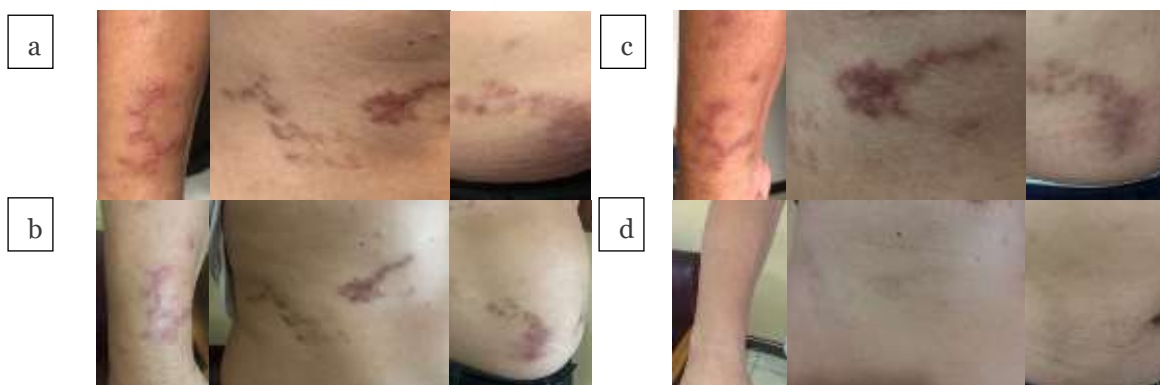


Figure 1. First patient. (A) Initial visit, (B) Follow-up 3 days after treatment, (C) Follow-up 1 week after treatment, (D) Follow-up 3 weeks after treatment

Case 2

The second case involves a 67-year-old female who presented with itchy red bumps arranged in a serpentine line on her right thigh for the past three weeks. The patient has a hobby of gardening without using protective gear. Dermatological examination revealed multiple linear serpiginous erythematous papules on the right femoral region. Supportive examinations included dermoscopy, which showed white-yellowish linear lines representing the larva's body against a pinkish erythematous background and brown dots corresponding to the empty larval tracts (Figure 2).

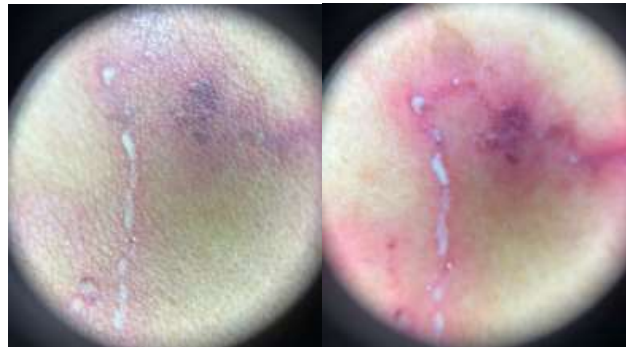


Figure 2. Dermoscopy of the second patient.

The working diagnosis for the patient is CLM. The patient was treated with a single oral dose of ivermectin 12 mg and cetirizine 10 mg at night. Evaluation at 1 week and 3 weeks showed no new lesions, and the itching had disappeared. Dermatological examination revealed post inflammatory hyperpigmented macules and crusts on the right femoral region (Figure 3).

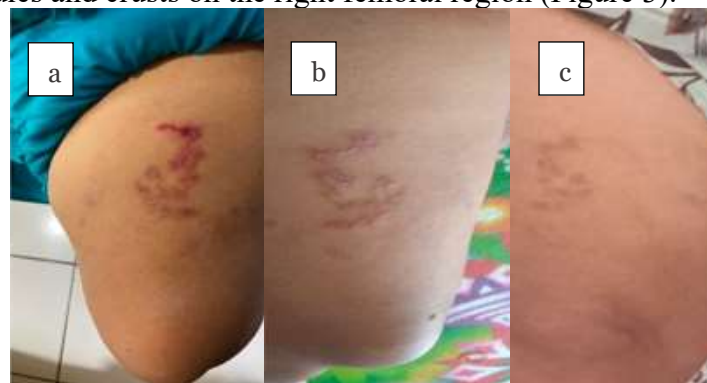


Figure 3. Second patient. (A) First visit, (B) Follow up after 1 week of therapy, (C) Follow up after 3 weeks of therapy.

Case 3

The third case involves a 40-year-old female who presented with itchy red bumps arranged in a serpentine line on her right calf for one month after going to the beach, swimming, and burying her feet in the sand. The patient applied betamethasone cream, but it showed no improvement. Dermatological examination revealed multiple linear serpiginous erythematous papules, along with erosions, excoriations, and crusts on the right tibia and fibula regions. Supportive examinations included dermoscopy, which showed white linear lines representing the larva's body against a pinkish erythematous background and brown dots corresponding to the empty larval tracts (Figure 4).



Figure 4. Dermoscopy of the third patient.

The patient was diagnosed with CLM and treated with a single oral dose of ivermectin 12 mg and cetirizine 10 mg. Evaluation at the first and second weeks showed no new lesions, and the itching disappeared. Dermatological examination revealed post-inflammatory hyperpigmented macules and crusts on the right fibula region (Figure 5). The prognosis for all three patients is good regarding life expectancy (*quo ad vitam bonam*), function (*quo ad functionam bonam*), and recovery (*quo ad sanationam bonam*).

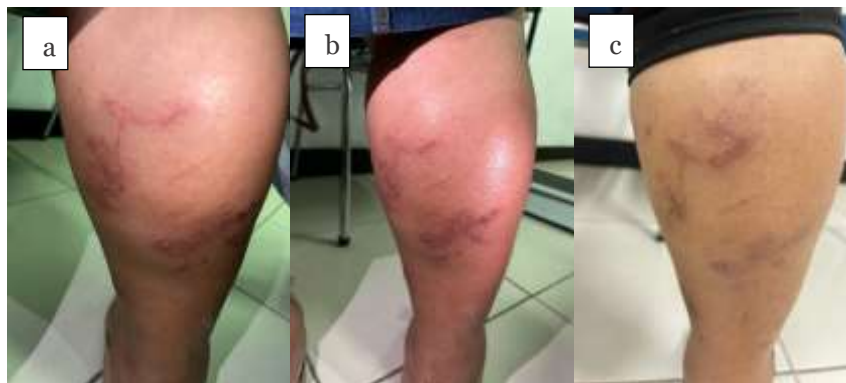


Figure 5. Third patient. (A) Initial visit, (B) Follow-up 1 week after treatment, (C) Follow up 2 weeks after treatment.

DISCUSSION

Cutaneous larva migrans is an erythematous linear or serpiginous skin eruption caused by the penetration of hookworm larvae through the epidermis. (Cáceres-Ríos, H., et al., 2020). Lesions can be solitary or multiple, developing into erythematous or vesiculobullous lesions within a few days, followed by itching at the site of larval penetration. (Cáceres-Ríos, H., et al., 2020). In the medical histories of the three patients in this case series, there were complaints of bumpy, serpiginous, itchy lesions in areas that had contact with the soil. Initially, red, very itchy bumps appeared, which then elongated in a serpentine pattern over time. Patients experienced intense itching and frequently scratched the lesions, noting that the lesions extended and itched more.

Infection typically occurs in individuals working in warm, humid, sandy environments, such as farmers, hunters, construction workers, plumbers, and gardeners, after skin contact with soil or sand contaminated with cat or dog feces. (Tasbun, F., et al., 2022; Maxfield, L., et al., 2024; Ramondetta, A., et al., 2021; Shamad, M., et al., 2024). Patients in this case series experienced these symptoms after working in potentially contaminated environments. The first and second patients had a history of gardening without protection, while the first and third patients had direct contact with sand at the lake without footwear. Awareness of the risks of contact with potentially contaminated

environments can prevent CLM infection. (Tasbun, F., et al., 2022; Maxfield, L., et al., 2024; Ramondetta, A., et al., 2021; Shamad, M., et al., 2024).

Dermatological examination in the three cases revealed multiple linear serpiginous erythematous papules, resulting from contact with contaminated soil or sand. Hookworm larvae use protease and hyaluronidase enzymes to penetrate the epidermis, digesting the keratin within it, causing itchy erythematous serpiginous lesions after 1–5 days. (Tianyi, F. L., et al., 2020). Lesions typically appear on the feet, buttocks, and hands, sometimes also on the head and abdomen. (Lander, M., et al., 2020). The diagnosis of CLM in these cases was based on medical history and physical examination.⁷ Supportive examinations are necessary when the diagnosis cannot be clinically confirmed or to ensure the presence of additional infections. (Lander, M., et al., 2020; Mansur, F. A. F., 2021).

The management of patients in this case series was with a single oral dose of 12 mg ivermectin. CLM usually resolves on its own, but treatment is necessary in cases with severe itching. (Mansur, F. A. F., 2021). Treatment options include albendazole, a single oral dose of ivermectin, topical thiabendazole, or cryotherapy. (Caumes, E., et al., 2023). Oral ivermectin is effective with a cure rate close to 100%, and its main advantage is the single 200 µg/kg dose taken by the patient. (Mansur, F. A. F., 2021; Caumes, E., et al., 2023). The first patient had attempted to treat CLM with mebendazole. Although mebendazole has a broad anthelmintic spectrum, it has low oral bioavailability, below 10%, making it less effective in treating tissue infections like CLM. Despite being often chosen as an alternative to albendazole due to its availability, albendazole and ivermectin remain the main choices for CLM treatment. (Choudhary, S., et al., 2023). The use of mebendazole in CLM often does not provide adequate clinical response, so definitive treatment requires albendazole or ivermectin. (Choudhary, S., et al., 2023). The third patient attempted to treat the condition with betamethasone cream, a topical corticosteroid with anti-inflammatory and antipruritic effects. Although it can relieve inflammatory symptoms and itching, topical steroids like betamethasone do not affect the hookworm larvae and do not provide adequate therapeutic effect, so the primary treatment for CLM remains oral antiparasitics. (Choudhary, S., et al., 2023).

Ivermectin is an effective anthelmintic against hookworm larvae. (Crump, A., et al., 2023). Its mechanism of action involves the role of GABA in peripheral nerve transmission, causing paralysis and death of the worms.²¹ A single dose of 12 mg ivermectin for CLM can achieve cure rates up to 100%, with rapid absorption and wide tissue distribution. (Caumes, E., et al., 2023). Ivermectin disrupts the function of tubulin, a structural protein forming microtubules, causing degeneration of the larvae and worms' intestinal microtubules, inhibiting larval development into adults and reducing the adult worm population. (Choudhary, S., et al., 2023). Additionally, ivermectin has anti-inflammatory effects by inhibiting cytokine release, helping reduce skin inflammation caused by CLM infection. (Kincaid, L., et al., 2015). A study by Caumes et al. compared the effectiveness of a single oral dose of 12 mg ivermectin with a single oral dose of 400 mg albendazole in the treatment of CLM. (Caumes, E., et al., 2003). All patients who received ivermectin showed a good response with a cure rate of 100%, while 5 patients who received albendazole experienced recurrence after 11 days of treatment, with a cure rate of 46%. No serious side effects were found in either treatment group. This is the first study of ivermectin for CLM infection in Indonesia, so there's still little-known research about it. A study in Europe with administering of ivermectin on CLM case also found a complete resolution. (Shamad, M., et al., 2024). The study concluded that a single dose of 12 mg ivermectin is effective for the treatment of CLM.

CONCLUSION

This case series of CLM demonstrates that oral therapy with ivermectin provides a good clinical response, with no significant side effects reported, and all patients were able to achieve complete recovery.

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